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SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER	
ARCOS, CAROLINE H	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/643,587	KLAUSLER, PETER M.	
	Examiner	Art Unit	
	CAROLINE ARCOS	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-2, 5-10, 13-18 and 21-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-10,13-18 and 21-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *05/07/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-2, 5-10, 13-18 and 21-24 are pending for examination. Claims 3-4, 11-12 and 19-20 has been cancelled.

Claim Objections

2. Claims 17-24 are objected to because "tangible computer readable media" lacks antecedent basis in the specification. Applicant is advised to amend the claims to recite "computer storage medium" to overcome the claim objection.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-2, 5-10, 13-18 and 21-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. The claim language in the following claims is not clearly understood:

i. As per claim 1, Lines 4-5, it is unclear whether "the program units" associated with the process is the same "program units" in line 1? Line 5, it uncertain whether or not the program units executing on one or more of the plurality of multiple processor units? The word "may" is indefinite for failing to particularly point out and distinctly claim the subject matter. Lines 7-8, it is not

clearly understood what cause the occurrence of the context switch event? Does the context switch event occurs to only the first program unit of the same process or does it occur to the first program unit of any other process? Lines 9, it is not clearly understood what is the criteria and reason for migrating one or more of the plurality of program units? (i.e. failure or shortage of resource?) Lines 9-10, it is not clearly understood to which one of the plurality of multiple processing units the one or more program units are migrating? (i.e. to the one processing units which has the most of the program units of the same process or the one with the lightest load?) lines 9-12, it is not clearly understood whether the migration of any one or more program units of any process or only to one or more program units of the same process which the context switch event occurs to the same process first program unit? Line 13, it is unclear how the synchronization of the scheduling of each of the plurality of the program units and what is the criteria for synchronization? Lines 14-15, it is unclear whether setting of the context of each of the plurality of the program units of the same process or different processes?

ii. As per claim 9, Line 7, it is uncertain whether or not at least one of the processors is performing the tasks? The word "operable" is indefinite and fails to particularly point out and distinctly claim the subject matter. Line 9, it is not clearly understood whether "a plurality of program units" is the same as "the program units" associated with the process? (i.e. if it is the same it should be referred to as the plurality of program units) what is the relation between "a plurality of program units", "the program units" and "program units" in line 1?

(i.e. are they the same plurality of program units that are associated with the same process or different?) Lines 10-11, it uncertain whether or not the program units executing on one or more of the plurality of multiple processor units? The word "may" is indefinite for failing to particularly point out and distinctly claim the subject matter. Line 13, it is uncertain whether or not at least one of the processors is migrating one or more of the plurality of program units. The word "operable" is indefinite and fails to particularly point out and distinctly claim the subject matter. Lines 12-13, it is not clearly understood what cause the occurrence of the context switch event? Does the context switch event occur only to the first program unit of the same process or does it occur to the first program unit of any other process? Lines 14, it is not clearly understood what is the criteria and reason for migrating one or more of the plurality of program units? (i.e. failure or shortage of resource?) Lines 14-17, it is not clearly understood to which one of the plurality of multiple processing units the one or more program units are migrating? (i.e. migrate to the one processing units which has the most of the program units of the same process or the one with the lightest load?) lines 14-17, it is not clearly understood whether the migration of any one or more program units of any process or only to one or more program units of the same process which the context switch event occurs to the same process first program unit? Line 18, it is unclear how the synchronization of the scheduling of each of the plurality of the program units and what is the criteria for synchronization? Lines

19-21, it is unclear whether setting of the context of each of the plurality of the program units of the same process or different processes?

iii. As per claim 17, Line 5, it is unclear whether "the program units" associated with the process is the same "program units" in line 2? Lines 6-7, it uncertain whether or not the program units executing on one or more of the plurality of multiple processor units? The word "may" is indefinite for failing to particularly point out and distinctly claim the subject matter. Lines 8-9, it is not clearly understood what cause the occurrence of the context switch event? Does the context switch event occurs to only the first program unit of the same process or does it occur to the first program unit of any other process? Lines 10-11, it is not clearly understood what is the criteria and reason for migrating one or more of the plurality of program units? (i.e. failure or shortage of resource?) Lines 9-10, it is not clearly understood to which one of the plurality of multiple processing units the one or more program units are migrating? (i.e. to the one processing units which has the most of the program units of the same process or the one with the lightest load?) lines 10-13, it is not clearly understood whether the migration of any one or more program units of any process or only migrating the one or more program units of the same process which the context switch event occurs to the same process first program unit? Line 14, it is unclear how the synchronization of the scheduling of each of the plurality of the program units and what is the criteria for synchronization? Lines 15-16, it is unclear whether setting of the context of

each of the plurality of the program units of the same process or different processes?

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-2, 5-10, 13-18 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krause (US 6,047,323), in view of Gillespie (US 6,269,391) and further in view of Alverson et al. (US 6,952,827 B1).

7. As per claim1, Krause teaches the invention substantially as claimed including a method for scheduling program units, the method comprising:

starting a process (stream) within an operating system executing in a system having a plurality of multiple processor units (nodes), each of the multiple processor units having a plurality of processors (abs., lines 1-9; col.2, lines 7-8; col. 2, lines 16-27);

starting a plurality of program units (modules/drivers) within the operating system, the program units associated with the process (stream), wherein the program units may execute on two or more of the plurality of multiple processor units (col. 2, lines 39-46); and

upon the occurrence of a context shifting event, performing the tasks of:

migrating one or more the plurality of program units from one or more of the plurality of

multiple processing units to one of the plurality of multiple processing units such that the plurality of program units associated with the process are executing on the same multiple processor unit (abs., lines 24-26; col. 1, lines 64-67; col., col. 2, lines 47-48).

8. Krause doesn't explicitly teach upon the occurrence of a context shifting event for a first program unit of the plurality of program units, performing the tasks of:

synchronizing the scheduling of each of the plurality of program units and

setting the context of each of the plurality of program units such that each of the program units process the same context shifting event as the first program unit.

9. However, Gillespie teaches upon the occurrence of a context shifting event performing the tasks of (col.3, lines 36-38):

synchronizing the scheduling of each of the plurality of program units (col. 3, lines 35-37; col. 37, lines 36-37) and

setting the context of each of the plurality of program units (col.3, lines 45-53; wherein "thread- control object" is the context of each of the plurality of program units as claimed).

10. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Krause and Gillespie because Gillespie's teaching of synchronizing execution and setting context of each of the plurality of program units would improve system performance by saving the context / state of each of the plurality of program units prevents redundant data execution and prepare the threads for continuing execution from the point they

were stopped.

11. The combined teaching of Gillespie and Krause doesn't explicitly teach upon the occurrence of a context shifting event for a first program unit of the plurality of program units and each of the program units process the same context shifting event as the first program unit.

12. However, Alverson teaches upon the occurrence of a context shifting event for a first program unit of the plurality of program units and each of the program units process the same context shifting event as the first program unit (col. 5, lines 4-9; col.5, lines 29-36).

13. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Krause, Gillespie and Alverson because Alverson teaching would improve threads scheduling and reliability by allowing the threads to restart efficiently in a later time without corrupting the state of the threads.

14. As per claim 2, Gillespie teaches that the program unit comprises a thread (col.2, lines 40-44).

15. As per claim 5, Gillespie teaches the context shifting event comprises an exception (col. 4, lines 26-27).

16. As per claim 6, Gillespie teaches the exception comprises a signal (col. 4, lines 26-27; col. 5, lines 58-59).

17. As per claim 7, Gillespie teaches that the context shifting event comprises a non-local goto (col. 18, lines 40-45).

18. As per claim 8, Alverson teaches that the context shifting event comprises a system call (col. 9, lines 25-30).

19. As per claim 9, Krause teaches a system (cluster) for scheduling program units, the system comprising:

a plurality of multiple processor units (nodes), each multiple processor unit having a plurality of processors, wherein each of the plurality of processors on a multiple processor unit shares cache memory (col. 2, lines 16-17);

a memory coupled to the plurality of multiple processor units(col. 2, lines 16-17); and an operating environment stored in the memory and executed by at least one of the processors wherein at least one of the processors is operable to perform the tasks of (abs., lines 2-7):

start a process (col. 2, lines 39-40; col.3, lines 21-23),

start a plurality of program units within an operating system, the program units associated with the process, wherein the program units may execute on two or more of the plurality of multiple processor units (col. 2, lines 41-44), and

upon the occurrence of a context shifting event, at least one of the processors is operable to:

migrate one or more of the plurality of program units from one or more of the plurality of multiple processing units to one of the plurality of multiple processing units such that the plurality of program units associated with the process are executing on the same multiple processor unit (abs., lines 24-26; col. 1, lines 64-67; col., col. 2, lines 47-48).

20. Krause doesn't explicitly teach that upon the occurrence of a context shifting event for a first program unit of the plurality of program units,

synchronize the scheduling of each of the plurality of program units, and

set the context of each of the plurality of program units such that the program units process the same context shifting event as the first program unit.

21. However, Gillespie teaches upon the occurrence of a context shifting event (col.3, lines 36-38):

synchronizing the scheduling of each of the plurality of program units (col. 3, lines 35-37; col. 37, lines 36-37) and

set the context of each of the plurality of program units (col.3, lines 45-53; wherein "thread- control object" is the context of each of the plurality of program units as claimed).

22. The combined teaching of Gillespie and Krause doesn't explicitly teach upon the occurrence of a context shifting event for a first program unit of the plurality of program units

and each of the program units process the same context shifting event as the first program unit.

23. However, Alverson teaches upon the occurrence of a context shifting event for a first program unit of the plurality of program units and each of the program units process the same context shifting event as the first program unit (col. 5, lines 4-9; col.5, lines 29-36).

24. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Krause, Gillespie and Alverson because Alverson teaching would improve threads scheduling and reliability by allowing the threads to restart efficiently in a later time without corrupting the state of the threads.

25. As per claim 10, it is the system claim of the method claim 2. Therefore, it is rejected under the same rational.

26. As per claims 13-16, they are the system claims of the method claim 5-8. Therefore, they are rejected under the same rational.

27. As per claim 17, Krause teaches a tangible computer-readable media having computer-executable instructions for performing a method for scheduling program units, the method comprising:

starting a process within an operating system executing in a system having a plurality of multiple processor units, each of the multiple processor units having a plurality of processors

(col. 2, lines 16-17; col. 2, lines 39-40; col.3, lines 21-23);

starting a plurality of program units within the operating system, the program units associated with the process, wherein the program units may execute on two or more of the plurality of multiple processor units(col. 2, lines 41-44); and

upon the occurrence of a context shifting event, at least one of the processors is operable to:

migrate one or more of the plurality of program units from one or more of the plurality of multiple processing units to one of the plurality of multiple processing units such that the plurality of program units associated with the process are executing on the same multiple processor unit (abs., lines 24-26; col. 1, lines 64-67; col., col. 2, lines 47-48).

28. Krause doesn't explicitly teach that upon the occurrence of a context shifting event for a first program unit of the plurality of program units,

synchronize the scheduling of each of the plurality of program units, and

set the context of each of the plurality of program units such that the program units process the same context shifting event as the first program unit.

29. However, Gillespie teaches upon the occurrence of a context shifting event (col.3, lines 36-38):

synchronizing the scheduling of each of the plurality of program units (col. 3, lines 35-37; col. 37, lines 36-37) and

set the context of each of the plurality of program units (col.3, lines 45-53; wherein

"thread- control object" is the context of each of the plurality of program units as claimed).

30. The combined teaching of Gillespie and Krause doesn't explicitly teach upon the occurrence of a context shifting event for a first program unit of the plurality of program units and each of the program units process the same context shifting event as the first program unit.

31. However, Alverson teaches upon the occurrence of a context shifting event for a first program unit of the plurality of program units and each of the program units process the same context shifting event as the first program unit (col. 5, lines 4-9; col.5, lines 29-36).

32. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Krause, Gillespie and Alverson because Alverson teaching would improve threads scheduling and reliability by allowing the threads to restart efficiently in a later time without corrupting the state of the threads.

33. As per claim 18, it is the computer-readable media of the method claim 2. Therefore, it is rejected under the same rational.

34. As per claims 21-24, they are the computer-readable media of the method claim 5-8. Therefore, they are rejected under the same rational.

Conclusion

35. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 5613114 A teaches System and method for custom context switching.

US 6553486 B1 teaches Context switching for vector transfer unit.

36. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAROLINE ARCOS whose telephone number is (571)270-3151. The examiner can normally be reached on Monday-Thursday 7:00 AM to 5:30 PM.

37. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

38. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Patent examiner
Caroline Arcos

/Li B. Zhen/
Primary Examiner, Art Unit 2194